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GENERAL ARTICLES

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BUDGETARY IMPACTS OF THIRD WORLD ARMS PRODUCTION

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ABSTRACT

One of the more intriguing empirical findings in recent years is evidence that a number of Third World economies experience a positive relationship between military expenditures and overall rates of economic growth. While this result has been found in a number of individual studies, no satisfactory explanation has been put forth -- presumably defense expenditures have both positive spin-offs, tending to support growth, and a number of negative aspects such a crowding out of private sector investment which tend to reduce overall growth. It is something of a tautology therefore to argue that those countries experiencing net positive benefits from defense expenditure simply have an environment where the net positive effects predominate. The purpose of this paper is to show that Third World arms producers differ considerably in terms of budgetary priorities from their non producer counterparts. More importantly it can be demonstrated that differences in budgetary priorities between these two groups of countries is consistent with the fact that arms producers tend to obtain net positive benefits from military expenditures while non-producers find their overall rates of growth declining with increased allocations to defense.

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INTRODUCTION

Despite an explosion of studies on the impact of defense expenditures on developing country growth, no clear and simple answer to the question--does defense spending have an impact of economic performance --has emerged. Depending on the researcher, the answer could be yes, maybe, or no with different degrees of confidence. There is also considerable disagreement about the nature of this impact, if it exists. Suggesting a reciprocal relationship between military outlay and economic performance, some analysts feel that as current defense spending can affect future economic performance, current or expected economic conditions can influence governmental decisions about how much to spend on defense[1].

As Chan[2] noted, we need to decompose the research problems in this area into separate questions and ask: (1) what kind of impact (2) how does this this impact occur (3) what are the relevant measures of defense burden and the relevant measures of economic performance (4) when is this impact more likely to be felt (5) which countries are more likely to experience this impact (6) what are the opportunity costs of this impact (7) which domestic groups and areas are more likely to benefit or to be hurt by this impact and (8) what are the policy implications of this impact.

The purpose of this paper is to make a first attempt at answering several of these questions by integrating two major areas of research -- the defense growth debate and the defense budgetary tradeoffs debate -- that despite their rather obvious connection have been undertaken quite independently from one another. More specifically the analysis below shows that:

1. When examining Third World countries as sub sets

a domestic arms industry, one finds sharply diverging results as to the impact of the military burden on growth.

2. The budgetary tradeoffs between defense and non-defense expenditures differ considerably depending on whether a country is an arms producer or not.

3. Differences in the budgetary process in arms producing and non-arms producing countries are likely to account in part for the contrasting impact that increased military burdens have with respect to each group of countries.

The main contribution of the analysis below to the ongoing defense growth debate is the identification of a clear and unambiguous mechanism leading from changes in the military burden to variations in overall economic growth. Previously, linkages from the military burden to growth have been alluded to by various researchers, but none have been quantitatively identified.

PREVIOUS ANALYSIS

There are many hypotheses one can develop about the manner in which increased defense spending may affect growth favorably or unfavorably. Rothchild[3], Benoit[4], Deger and Sen[5], Frederiksen and Looney[6], Looney[7], Faini, Annez and Taylor[8], Leontief and Duchin[9], Lim[10], Deger and Smith[11], Biswas and Ram[12], have advanced a variety of arguments.

Despite the diversity in their approaches and arguments, most researchers probably recognize two important mechanisms through which military expenditures may affect economic growth[13]:

1. the military sector may for a variety of reasons generate positive or negative externalities for the rest of the economy; and

2. there may be important factor productivity differences between the two sectors.

In his seminal work, Benoit[14], after controlling for the effects of investment and bilateral economic assistance, found (for the period 1960-65) a positive

and significant relationship between the defense burden
(defense expenditures share in gross national product)
and the growth in civilian GNP. On the other hand,
over the 1950-65 period he did not find a statistically
significant relationship between the defense burden
and growth.

In Benoit's view, the positive correlation in the
shorter time period indicated that military
expenditures were more likely to be the cause rather
than the effect of faster economic growth. His actual
conclusions, however, were stated in rather cautious
and tentative terms[15]:

> We have been unable to establish whether the
> net growth effects of defense expenditures
> have been positive or not. On the basis of
> all the evidence we suspect that they have
> been positive ... but we have not been able
> to prove this. Heavy defense expenditure
> does not, however, appear to have been
> associated with lower growth rates, even
> after adjusting for differences in foreign
> aid receipts and investment rates and this in
> itself is surprising.

The positive relationship found by Benoit between
the defense burden and economic growth could, however,
be spurious because economic growth could be caused by
the inflow of other types of foreign resources not just
aid. There has also been considerable skepticism
regarding Benoit's explanation that rising military
expenditures stimulate private demand and encourage
fuller utilization of production facilities. Several
critics have argued that the main problem facing
developing countries is not inadequate demand and
underutilized capacity, but severe production
bottlenecks in precisely those industrial sectors that
are likely to be further strained to cope with
additional defense demands. Finally, several analysts
have objected to Benoit's structural specification of

the analytic model linking defense expenditures to
growth and his measure of the defense burden used in
his model[16].

Although the studies that attempt to verify Benoit's
results do not always agree among themselves, they have
not, on the whole, supported his conclusion. Some
failed to find any strong and systematic relationship
between defense spending and economic growth in the
Third World. Others actually discovered a significant
negative relationship between these variables, either
for developing countries as a whole, or at least for
some subsets of countries. While some analysts found a
positive relationship for several countries, such as
the OPEC countries, or a somewhat even larger group of
unconstrained countries[17], this phenomenon appears
more the exception than the rule. None of the
validating studies would support Benoit's observation
that the positive impact of military expenditures on
growth is a widespread phenomenon among developing
countries. On the other hand, the evidence in support
of a negative relationship between defense spending
and economic growth has usually produced modest (albeit
statistically significant) tradeoff and sometimes is
derived from very small samples of subsets of the
developing countries[18].

As noted above, the major deficiency common to most
of these studies is their omission, except in a very
general sort of way of the specification of a mechanism
through which military burdens impact on growth.
Benoit's resort to Keynesian demand creation effects
for net positive impacts and Frederiksen and Looney's
assertion of the net negative impacts on overall growth
stemming from the appropriation of scarce foreign
exchange by the military, remain as the standard
explanations for the observed impacts of defense
expenditure on growth in the Third World[19].

Completely isolated from the defense growth debate, a number of researchers have been simultaneously attempting to determine whether increases in defense expenditures in Third World public sector budgets systematically displace various socioeconomic allocations.

To date analyses of budgetary tradeoffs[20]:

1. have concentrated almost exclusively on the developed countries;
2. have proceeded from a variety of theoretical perspectives;
3. have employed an array of methodological approaches; and
4. have produced conflicting and mixed results.

Peroff and Warren[21] conclude that "the number of studies which indicates the existence of a tradeoff approximates the number that shows that none exists."[22]

While the bulk of the research on budgetary tradeoffs between defense and social program expenditures has focused on the industrial countries of North America and Western Europe, Hayes[23], has suggested that the problem of tradeoffs between defense spending and social investments "is perhaps even more serious in the developing countries."[24]

In a major United Nations report the Secretary General argued that when the needs of economic development are so pressing in the developing countries, it is

> a disturbing thought that these countries
> have found it necessary to increasing
> military spending so speedily, particularly
> when their per capita income is so low."

The Study concluded that military expenditures undoubtedly absorb resources that are

> substantial enough to make a considerable
> difference, both in the level of investment
> for civil purposes, and in the volume of

> resources which can be devoted to improving
> man's lot through social and other
> services[25].

The clear implication of this United Nations report is that increased defense spending may have negative consequences for socioeconomic development programs such as health, education, and economic services.

Clearly, the basic criticism leveled against defense expenditures is that they reduce the total resources available for economic development programs such as health, education, and economic services.

Therefore, the basic and rather obvious criticism leveled against defense expenditures is the usual guns vs butter dichotomy i.e., that increases in defense expenditures reduce the total resources available for economic and social development. The growing need on the part of developing countries for both domestic and foreign resources could be met, it is argued, by freeing some of the current allocations for defense, especially where economic difficulties demand major structural adjustments. Critics of defense expenditures argue that allocations in this area complicate the task of adjustment, since they escape analysis and scrutiny while using up high opportunity resources[26].

While this argument appears sound in a zero-sum world, in actuality these fears are somewhat surprisingly not always borne out. For example, in her analysis of budgetary allocations to defense and a variety of socioeconomic programs in Brazil between 1950 and 1967, Hayes[27] concluded that military spending did not necessarily yield negative consequences for social and economic investments. She found that substitutions between military allocations and allocations to other sectors do occur frequently,

but that the burden of these substitutions is distributed across all categories at one time or another. Further she judged that when they do occur, these substitutions are not severe. Finally she determined that (at least in the Brazilian case) a zero-sum situation did not always occur between defense and non defense allocations in the sense that defense spending was often accompanied by substantial increases in spending for infrastructure and other development related activities as the central government expanded its overall level of expenditures.

She did find on the other hand that increased defense spending has some negative effects on social spending, but that this "was mild because social investment was not a major priority of any of the regimes examined."[28] Nevertheless, Hayes reported a correlation of -0.23 between defense and social development (education, health, welfare) expenditures measured as percentages of the total public budget. In addition , she found a -0.28 correlation between spending on military personnel and social development expenditures. Although "theoretical generalizations cannot be made and hypotheses cannot be accepted or rejected on the basis of evidence from a single case,"[29] Hayes research seems to indicate at most some potential competition between military expenditures and socio economic budgetary allocations.

Even more surprising (and counter-intuitive) was the finding of Ames and Goff[30] (using pooled cross-section series data for 18 Latin American countries for the period 1948-1968) that education and defense spending tend to increase and decrease simultaneously. Correlating defense and education spending in absolute terms, as percentage changes from year to year and relative total budget and gross domestic product for

individual years (and regimes), Ames and Goff found rather high positive correlations between defense and education expenditures measured relative to the total budget. Mindful of serious auto-correlation problems in their analysis, Ames and Goff concluded that although other (presumably unidentifiable) policy areas may lose out in the budgetary process, neither education nor defense "gains at the expense of the other."[31]

In summary, as in the defense/growth debate, there is conflicting evidence about the interaction of defense with other growth inducing variables[32]. In the following analysis an attempt is made to build upon the studies summarized above, and to specify more precisely the extent, direction and form of the defense/socioeconomic spending tradeoffs in Third World countries. More importantly, an attempt is made to demonstrate that these observed budgetary tradeoffs are quite consistent with the impact that defense expenditures apparently have on overall economic growth. More precisely if we find that allocations to agriculture are systematically reduced during periods of increased defense expenditures, we might anticipate a series of events -- food shortages, increased imports, increased cost of raw materials, depressed demand for non-agricultural products, and so on. The net effect of this sequence would most likely be reduced rates of overall growth.

EMPIRICAL RESULTS

Starting with a simple Benoit type framework, the impact of the military burden (here defined as the average level of military expenditures per capita over the 1970-81 period) on overall economic growth[33] (GDPGB) for the period 1970-82 was first examined.

Benoit's basic equation was expanded somewhat to take into account factors identified in subsequent studies as bearing an impact on overall economic growth. These variables included:

1. The capital output ratio (ICOR), here defined as the growth in GDP 1970-81 divided by the growth in investment over the same period. Lim[34] found this variable to be particularly useful in his defense growth analysis.

2. The growth of investment (GDIGB) over the 1970-82 period. Empirically this variable gave results superior to Benoit's measure -- the share of investment in GDP.

3. The inflation rate over the 1970-82 period (INFB) was included to control for the possible effect increases in the defense burden may have on price increases (and of course the subsequent impact of inflation on growth. Deger and Smith's recent study appears to indicate that some inflationary pressures may stem from increases in the defense burden[35].

4. The external public debt accumulated by the end of the time period (1982). This variable replaces Benoit's foreign aid and reflects more accurately the nature of capital flows to Third World countries in the 1970s and early 1980s[36]. The variable used to proxy the effective external public debt was debt service to export ratio in 1982 (DSEB).

A balance of payments constraint proxied by the average resource balance (RBB) over the 1970-82 period was included to control for the OPEC type countries whose surpluses on current account might offset any negative impact the defense burden might have _per se_ on growth; and finally;

5. The average budgetary surplus or deficit (GDB) as a percent of gdp over the 1970-82 period. This variable was included to control for the dampening impact austerity programs might have had on growth over and above that associated with increases in the military burden.

For the total sample:

$$GDPGB = 0.83 \text{ GDIGB} - 0.03 \text{ MEP} - 0.14 \text{ INFB}$$
$$ (7.69) (-0.33) (-1.48)$$

$$+ 0.19 \text{ RBB} - 0.26 \text{ GDB}$$
$$ (1.65) (-2.34)$$

$$r2 = 0.621; \quad F = 15.13; \quad DF = 51$$

Real GDP growth over the 1970-82 period was found to be largely a function of the rate of real growth in investment over the same time period (the regression coefficients are standardized estimates) and the extent to which the government was running budgetary deficits during this period (a negative sign on the government deficit term -- GDB indicates that increased deficits had a stimulating effect on overall growth).

Surprisingly, the military burden (MEP) was insignificant when included in the regression equation.

There may, however, be variations in the budgetary patterns in different groups of Third World countries. In particular it is logical to expect that the budgetary compositions and tradeoffs between defense expenditures and non-defense items might vary somewhat depending on whether the Third World country was an arms producer or not[37].

Clearly, the possession of a domestic arms industry will undoubtedly reduce budget flexibility in most developing countries. For example, it may be fairly easy for a non-arms producing country to cancel an international arms purchase during periods of economic austerity, but difficult for arms producers to close

down a local defense plant under the same economic
conditions[38].

Whether or not there is any systematic bias in the
way arms and non-arms producers determine their defense
non-defense budgetary tradeoffs may ultimately account
for the impact defense expenditures have on overall
growth in their respective economies. More
specifically, do arms producers or their non-producer
counterparts significantly and systematically reduce
growth inducing budgetary allocations to accommodate
increased military burdens.

Using the model estimated above for the total
sample of countries, the impact of increased military
burdens on growth in the producing and non producing
countries was estimated for each individual group of
countries.

For the non-arms producers[39]:

(b) $GDPGB = 1.10\ GDIGB - 0.63\ MEP + 0.24\ DSEB$
        (9.23)   (-5.35)   (2.24)

$r2 = 0.802;\ F = 28.50;\ DF = 35$

For the producing countries:

(c) $GDPGB = 0.76\ GDIGB + 0.84\ MEP - 0.60\ INFB$

        (4.35)   (3.14)   (-2.94)

        $+ 0.38\ RBB + 0.60\ ICOR$
        (2.80)   (2.33)

$r2 = 0.802;\ F = 11.35;\ DF = 19$

There are sharp contrasts between producer and non-
producer countries with regard to the impact of
increased military burdens on their respective rates of
growth:

1. The arms producers show a highly significant and
    positive impact on the military burden on
    growth, with external debt playing no
    significant role in affecting the overall rate
    of growth.
2. On the other hand countries not possessing an
    indigenous arms industry relied largely on
    domestic investment and external debt to

accelerate growth in an environment in which
increased military burdens had a high negative
impact on growth.

Is there a significant difference in the budgetary
patterns of arms producers and non-producers with
regard to the tradeoffs in non-defense allocations that
might account for the contrasting impacts of the
military burden on growth.

Budgetary tradeoffs were examined by constructing a
simple model of the form: share (x) = share (defense) +
control variable. Where share (x[40]) is the share of
a non-defense category in the government's budget.
Control variables were used to improve the
specification of the regression model, thus obtaining
less biased estimates. Three control variables were
selected -- (a) public consumption share of GDP in
1981, (b) government expenditure share of GDP in 1981,
and (c) the public external debt as a percent of GDP
in 1981[41].

For the total sample of countries (arms producers
and non-producers) it appears (Table 1) that increased
defense expenditures occur largely at the expense of
allocations for total economic services, especially
agriculture, and possibly other purposes.
Surprisingly, a large number of budgetary items are
complementary with defense (i.e. have positive signs in
the regression equations). In fact, general public
services, education, health, other community
activities, roads and other transportation and
community activities all increase or decrease with the
share of defense expenditures in the budget.

For the non-arms producers, much the same picture
(Table 2) emerges. In general, however, the
correlations between defense and non-defense items are
considerably higher than those obtained for the total
sample. Economic services, agriculture, and other

(standarized coefficients)

TABLE 1
BUDGETARY IMPACT OF DEFENSF EXPFNDITURES: TOTAL SAMPLE

Budgetary category	Share of Defense	Public Consumption Share of GDP	Government Expenditure Share of GDP	Public External Debt Burden	r^2	Statistics F	DW
General Public Services	0.64 (5.91)				0.475	19.95	46
Education	0.51 (4.07)	-0.21 (-1.94)	-0.09 (-0.69)		0.256	8.27	50
Health	0.53 (4.26)		0.02 (0.12)		0.281	9.39	50
Social Security	0.07 (0.49)		0.02 (0.11)		0.006	0.13	50
Housing & Community Activities	-0.14 (-1.02)			-0.37 (-2.26)	0.133	3.93	53
Other Community Activities	0.61 (2.32)		-0.11 (-0.95)		0.371	14.17	50
Economic Services	-0.38 (-3.03)			-0.37 (-2.91)	0.224	7.37	53
Agriculture	-0.43 (-3.35)		0.11 (-0.87)		0.215	6.58	50
Roads	0.50 (4.19)	-0.30 (-2.47)			0.365	12.35	45
Other Transport & Communications	0.54 (4.41)		-0.10 (-0.84)		0.289	9.74	50
Other Purposes	-0.25 (-1.79)		0.11 (0.78)		0.067	1.73	50

NOTE: ( ) = t statistic; r^2 correlation coefficient
DF = degrees of freedom

(standarized coefficients)

TABLE 2
BUDGETARY IMPACT OF DEFENSE EXPENDITURES NON ARMS PRODUCERS

Budgetary category	Share of Defense	Public Consumption Share of GDP	Government Expenditure Share of GDP	Public External Debt Burden	r^2	Statistics F	DW
General Public Services	0.79 (7.19)	-0.22 (-2.04)			0.711	29.43	26
Education	0.64 (4.73)	-0.33 (-2.41)			0.560	15.24	26
Health	0.64 (4.27)	-0.16 (-1.08)			0.460	10.23	26
Social Security	0.32 (1.80)		-0.18 (-1.05)		0.108	1.82	32
Housing & Community Activities	-0.32 (-1.99)			-0.39 (-2.36)	0.213	4.06	32
Other Community Activities	0.62 (4.28)		0.05 (0.32)		0.401	10.06	32
Economic Services	-0.41 (-2.64)			-0.41 (-2.65)	0.284	5.94	32
Agriculture	-0.52 (-2.34)			-0.08 (-0.36)	0.268	2.79	17
Roads	0.48 (2.16)	-0.31 (-1.37)			0.300	3.05	16
Other Transport & Communications	0.30 (1.29)	-0.36 (-1.51)			0.204	1.80	16
Other Purposes	-0.07 (-0.25)		0.21 (0.76)		0.043	0.30	15

NOTE: ( ) = t statistic; r^2 correlation coefficient
DF = degrees of freedom

TABLE 3
BUDGETARY IMPACT OF DEFENSE EXPENDITURES: ARMS PRODUCERS
(standardized coefficients)

Budgetary category	Share of Defense	Independent Variable			Statistics		
		Public Consumption Share of GDP	Government Expenditure Share of GDP	Public External Debt Burden	r²	F	DF
General Public Services	0 74 (4.62)	-0.38 (-2.37)			0.641	12.51	16
Education	0 33 (1.33)	-0.25 (-0.99)			0.153	1.26	16
Health	0 25 (1.16)			-0.43 (-1.90)	0.268	2.75	17
Social Security	-0.27 (-1.00)		0.21 (0 82)		0.100	0.72	15
Housing & Community Activities	-0.27 (1.20)			-0.42 (-1 90)	0.271	2.79	17
Other Community Activities	-0 82 (5.17)		-0 30 (-1.86)		0 681	13.88	15
Economic Services	-0.24 (1.05)	-0 43 (-1 89)			0 267	2.54	16
Agriculture	-0.52 (-2.34)		•	-0.08 (-0 36)	0.268	2.79	17
Roads	0.48 (2 16)	-0.31 (1 37)			0.300	3.05	16
Other Transport & Communications	0.30 (1 29)	0.36 (-1.51)			0.204	1.80	16
Other Purposes	-0.07 (-0.25)		0.21 (0 76)		0.043	0 30	15

NOTE: ( ) = t statistic; r² correlation coefficient
DF = degrees of freedom

purposes, and perhaps housing and community activities are cut by governments in the non-producing countries to accommodate increased shares of the budget allocated to defense. For this group (and in contrast to the total group of Third World countries) social security expenditures move in line with changes in the share of the budget allocated to defense.

As with the case of the defense/growth relationship, the arms producers show (Table 3) a sharply different pattern of budgetary tradeoffs. For this group of countries, only agriculture is significantly cut when the share of defense expenditures is expanded. In fact, no real clear pattern of tradeoffs exists for this group, with only general public services, other community activities and roads complementary to defense.

CONCLUSIONS

As noted at the beginning of this paper, little integration has taken place between the body of analysis focussed on the defense/growth issue, and that dealing with defense, non-defense budgetary tradeoffs. In part, one reason for the limited amount of research devoted to these issues probably stems from the fact that analysts examining large samples of developing countries are unlikely to find any particularly interesting linkages between defense and growth or between defense and non-defense budgetary categories. The results presented above confirm that for Third World countries as a whole the military burden does not appear to have a statistically significant impact on growth. In a similar manner, Third World countries as a group tend to have a pattern of budgetary tradeoffs between defense and non-defense items that in the net are unlikely to affect overall growth one way or another. For these countries, increases in the share

of the budget going to defense are also associated with increases in education, health, roads and other transport and communication -- items all likely to enhance growth. The corresponding reduction in the share of resources allocated to economic activities and agriculture, most likely reduces output with the net result that the overall impact of increased defense allocations on growth is neutral.

Non-arms producers, however, tend to cut a disproportionate number of growth enhancing allocations to accommodate expansions in the military budget. The net impact is one of increased military spending impacting negatively on growth.

In contrast, the arms producers as a group have tended to avoid sharp cuts in growth enhancing expenditures (with the exception of agriculture). The multiplier linkages between increases in the defense burden and the private sector must, in the aggregate, be sufficient to produce the observed increases in aggregate growth experienced by this group of countries.

Clearly, the mere possession of a domestic arms industry places some constraint on the budgetary process in arms producing countries that is not present in non-arms producing countries. The nature of this constraint will, however, most likely not be understood with any degree of certainty until after a number of detailed country studies are completed.

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[35] Deger and Smith, _op. cit_. See also their "Military Expenditures and Growth in Less Developed Countries," _Journal of Conflict Resolution_ (1984), vol. 28 pp. 335-53.

[36] Cf. Robert E. Looney and P.C. Frederiksen, "Defense Expenditures, External Public Debt and Growth in Developing Countries," _Journal of Peace Research, op. cit_.

[37] Cf. Robert Looney and P.C. Frederiksen, "Profiles of Current Latin American Arms Producers," _International Organization_ (Summer 1986), vol. 40 pp. 345-352. Here and in the present study arms producers are determined on the basis of whether a major weapons system is produced domestically. See Stephanie Neuman, "International Stratification and Third World Military Industries," _International Organization_ (Winter 1984), vol. 38 pp. 167-97 for a listing of the producers and their weapons production.

[38] David K. Whynes, _The Economics of Third World Military Expenditures_ (Austin: University of Texas Press, 1979), pp. 26-30.

[39] Only the statistically significant results are presented here.

[40] Budgetary data were taken from the International Monetary Fund, _Government Finance Statistics Yearbook_ (Washington, D.C.: International Monetary Fund) and are for the year 1981.

[41] For each budgetary item, the control variable with the highest t statistic was selected for the results presented in Tables 1,2 and 3.